

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/017480

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl⁷ C07D493/18, C07D493/04, C07D311/30, C07D307/93, C07C49/743, C07C45/80, A61K31/365, A61K31/352, A61K31/343, A61K35/78, A61P35/00, A61P35/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl⁷ C07D493/18, A61K31/365, A61K35/78, A61P35/00, A61P35/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
CAPlus (STN), REGISTRY (STN)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	Paulo Sergio PEREIRA et al., Sesquiterpene Lactones from Brazilian <i>Tithonia Diversifolia</i> , Phytochemistry, 1997, 45, pages 1445 to 1448	2 1, 4-7
A	Raghwendra PAL et al., Chemical Constituents of <i>Tithonia tagitiflora</i> Desf.: Part III-Constitution of Tagitinin-A, Indian Journal of Chemistry, Section B: Organic Chemical Including Medicinal Chemistry, 1976, 14B, pages 259 to 262	1, 2, 4-7
A	Raghwendra PAL et al., Chemical Constituents of <i>Tithonia tagitiflora</i> Desf.: Part IV-Tagitinin-C, D & F, Indian Journal of Chemistry, Section B: Organic Chemical Including Medicinal Chemistry, 1977, 15B, pages 208 to 211	1, 2, 4-7

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
15 March, 2005 (15.03.05)

Date of mailing of the international search report
05 April, 2005 (05.04.05)

Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Baruah Nabin C. et al., Sesquiterpene Lactones of <i>Tithonia diversifolia</i> . Stereochemistry of the Tagitinins and Related Compounds, Journal of Organic Chemistry, 1979, 44, pages 1831 to 1835	1, 2, 4-7
A	Raghwendra PAL et al., Antileukemic and Other Constituents of <i>Tithonia Tagitiflora</i> Desf., Journal of Pharmaceutical Sciences, 1976, 65, 6, pages 918 to 920	1, 2, 4-7
A	JP 2-264722 A (Tsumura & Co.), 29 October, 1990 (29.10.90), (Family: none)	1, 2, 4-7
E, X	Ryosuke KOBAYASHI et al., "Kikuka Shokubutsu <i>Tithonia diversifolia</i> (Nitobegiku) no Sesquiterpenoid Seibun ni Tsuite", Nippon Yakugakukai Nenkai Koen Yoshishu, 05 March, 2004 (05.03.04), 124th, 2, page 139	1, 2, 4-7

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
See extra sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
Claims 1, 2, and 4-7

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

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Continuation of Box No.III of continuation of first sheet (2)

In each claim of this application, each compound number given in the sentence does not coincide with the number given in the succeeding chemical formula. Thus, a judgment was made on the assumption that the chemical formula corresponding to the number used in the sentence is given in each claim.

For example, in claim 1, "compound (VI)" is given as [Chemical formula 1] succeeding "the following general formula (I):." However, the [Chemical formula 1] was actually regarded not as compound (VI) but as compound (I) (description, page 1).

The compounds (I) and (II) in the invention group relating to claims 1, 2, and 4-7 (invention group (1)) and the compound (III) in the invention relating to claim 3 (invention group (2)) do not have a chemical structure common therebetween. There is hence no special technical feature common between the two invention groups.

A matter common between the compounds represented by the formulae (I) and (II) given in claims 8, 9, and 21-24 (invention group (3)) and the compounds in the invention group (1) is considered to be the basic skeleton of the compound (I). However, compounds having such basic skeleton are known as apparent from the fact that they are described in the following documents 1 to 4. This point cannot hence be regarded as a special technical feature which contributes to the prior art.

A matter common between the compounds in the invention group (1) and each of the compound (IV) (invention group (4)) and compound (V) (invention group (5)) given in claims 8, 9, and 21-24 is considered to be part of the basic skeleton of the compound (I). However, compounds having such basic skeleton are known as apparent from the fact that they are described in the following documents 1 to 4. This point cannot hence be regarded as a special technical feature which contributes to the prior art.

The invention group relating to claims 10 and 11 (invention group (6)) is a process for producing a composition containing the compounds given in claims 1-3 and 8. However, this production process is a method by which raw materials containing the compounds are extracted and fractionated to finally obtain a mixture of these compounds. This process can hence be regarded as neither a process for producing the compound of claim 1 nor a process for producing a composition using the isolated compound of claim 1.

Therefore, the invention group (6), which relates to claims 10 and 11, has no special technical feature common with the invention group (1).

The invention group relating to claims 12 and 13 (invention group (7)) is methods of respectively obtaining the compounds given in claims 1-3 and 8. However, these methods each is a method of continuously separating the compounds through a series of operations from a composition comprising the compounds, which have no novel common skeleton as stated above. The invention group (7) hence has no special technical feature common with the invention group (1).

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Continuation of Box No.III of continuation of first sheet(3)

The invention group relating to claims 14 and 15 (invention group (8)) is a method of separating the compounds given in claims 1-3 and 8 into a first composition and a second composition. However, this production process is a method in which a composition comprising the compounds is fractionated to obtain two mixtures of these compounds. This method can hence be regarded as neither a process for producing the compound of claim 1 nor a process for producing a composition using the isolated compound of claim 1.

Therefore, the invention group (8), which relates to claims 14 and 15, has no special technical feature common with the invention group (1).

The invention group relating to claims 16 and 17 (invention group (9)) is methods of respectively obtaining the compounds given in part of claims 1-3 and 8. However, these methods each is a method of continuously separating the compounds through a series of operations from a composition comprising the compounds, which have no novel common skeleton as stated above. The invention group (9) hence has no special technical feature common with the invention group (1).

In claim 20, the compounds described in claims 1 and 2, the compound described in claim 3, and the compound described in claim 8 are included in the invention group (1), invention group (2), and invention group (3), respectively. As stated above, there is no matter which is common among these invention groups and is regarded as a technical feature contributing to the prior art.

A matter common between the invention group relating to claims 25 and 26 (invention group (11)) and the invention group (1) is considered to be the basic skeleton. However, compounds having the common structure are known as apparent from the fact that they are described in document 2 shown below. This point cannot hence be considered to be a special technical feature which contributes to the prior art.

The invention group relating to claims 27 and 28 (invention group (12)) is methods of respectively obtaining compounds (VI) to (IX); the invention group relating to claims 29 and 30 (invention group (13)) is a method of separating an unspecified composition comprising the compounds (VI) to (IX) into a third composition and a fourth composition; the invention group relating to claims 31 and 32 (invention group (14)) is methods of respectively obtaining the compounds (VI) and (IX); and the invention group relating to claims 33 and 34 (invention group (15)) is methods of respectively obtaining the compounds (VII) and (VIII). However, for the same reasons as those shown for the invention groups (6) to (10), the invention groups (12) to (15) each has no special technical feature common with the invention group (1).

A matter common between the compound (VI) given in claim 35 (invention group (16)) and the compounds in the invention group (1) is considered to be the basic skeleton of the compound (I). However, compounds having such basic skeleton are known as apparent from the fact that they are described in the following documents 1 to 4. This point cannot hence be regarded as a special technical feature which contributes to the prior art.

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Continuation of Box No.III of continuation of first sheet(4)

Furthermore, neither the compounds (VII) and (VIII) (invention group (17)) nor the compound (IX) (invention group (18)) described in claim 35 has any chemical structure common with the compounds of the invention group (1). There is hence no special technical feature common between the invention group (17) or (18) and the invention group (1).

From the above, the invention groups (1) to (18) are not considered to be so linked to one another as to form a single general inventive concept.

Document 1: Raghwendra Pal, et al., *Indian Journal of Chemistry*, Section B: Organic Chemical Including Medicinal Chemistry, 1976, 14B, pp.259-262

Document 2: Raghwendra Pal, et al., *Indian Journal of Chemistry*, Section B: Organic Chemical Including Medicinal Chemistry, 1977, 15B, pp.208-211

Document 3: Paulo Sergio Pereira, et al., *Phytochemistry*, 1997, 45, pp.1445-1448

Document 4: Baruah Nabin C., et al., *Journal of Organic Chemistry*, 1979, 44, pp.1831-1835

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